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USL/DBMS NASA/PC R&D PROJECT

SYSTEM DESIGN STANDARDS

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USL/DBMS NASA/PC R&D PROJECT SYSTEM DESIGN STANDARDS

This document establishes a set of system design standards intended to assure the completeness and quality of designs developed for PC R&D projects. These standards must be faithfully adhered to in order to be effective. Two related documents addressing programming and system test standards are:

1) "NASA/PC R&D C Programming Standards," USL/DBMS NASA/PC R&D Working Paper Series Report Number DBMS.NASA/PC R&D-11, October 5, 1984.

2) "NASA/PC R&D System Testing Standards," USL/DBMS NASA/PC R&D Working Paper Series Report Number DBMS.NASA/PC R&D-13, October 12, 1984.

Software systems and the procedures used to develop them must conform to the standards established in each of these documents.

PROBLEM DEFINITION

The focus of the problem definition is to produce a specification of the problem. This problem specification should detail which capabilities are to be incorporated into the design and which are not, and should not specify how the problem is to be solved. Be precise.

INITIAL DESIGN PLAN

This plan should be based on a rough problem analysis and should make some provision for each of the major technical problems involved. An estimate of the eventual system size should be calculated by estimating the sizes of each section of the rough analysis and adding them together. This very crude estimate will be used for planning only and is much better than "rolling dice." In addition, this plan should make some estimate of programming personnel, support personnel, and equipment requirements.

Consider design support tools to help in formulating an appropriate design. Test programs, simulators, data analysis programs, documentation tools, and status reporting tools can save much time in both design and programming activities.

DESIGN SPECIFICATION

The goal of the design specification is to specify an acceptable solution to the problem leaving no holes in the logic and no interface issues unresolved. This specification will provide a starting point for programming the system.

The design specification should consist of three primary parts, the program design, the file design, and the system data

flow overview. This requirement will allow a complete specification of the design, in enough detail to permit detailed evaluation and eventually to permit programming to proceed.

1) Program Design - A hierarchic description of the system that addresses any major design issues.

2) File Design - A detailed definition of all files accessed by more than one module.

3) System Data Flow Overview - A non-technical summarization of the system design emphasizing the operational relationships between components.

The design should emphasize modularity and should carefully detail interface specifications, in terms of inter-module communication and file relationships. The overall design structure must not be obscured by incorporating details that are better included at lower specification levels.

RE-EVALUATION

Once the initial design specification is complete, a complete re-evaluation of resource requirements should be performed. This estimate should be a much better fit to the

eventual requirements than the initial estimate.

The overall design should also be critically reviewed and any valid objections should be incorporated into design revisions. Once the design team is satisfied with the design, a project wide design review should be scheduled. This review should address the following issues:

1) The intended user's environment
2) The intended user's requirements
3) The system development environment
4) The system design requirements
5) An overall development schedule
6) Development resource requirements
7) Program design
8) File design
9) Current status
10) Identified problems.

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16. Abstract

This Working Paper Series entry establishes a set of system design standards intended to assure the completeness and quality of designs developed for PC R&D projects. The standards presented within this document include the areas of problem definition, initial design plan, design specification, and re-evaluation.

This report represents one of the 72 attachment reports to the University of Southwestern Louisiana's Final Report on NASA Grant NGT-19-010-900. Accordingly, appropriate care should be taken in using this report out of the context of the full Final Report.

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